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Even the *reading* knowledge of natural tongues required for study or reference would be immediately reduced to a minimum, because large amounts of matter which at present are not translated into the national languages, for no other reason than that the demand for it in each tongue will not justify the expense, could be translated into the accepted international idiom, as it would then have the world for a market. Every year this minimum would steadily approach zero, as new theories and methods superseded old and were given to the world by their authors, in Esperanto.

The desirability of having an author's own words and expressions, whether one is studying him privately or quoting from his works, is only another reason why that author, when desiring to reach all the world, should write in a common tongue, which all the world can easily understand, and the acquisition of which, to those chemists or other scientists of the present day who already know English, French and German, is but child's play. Such should be willing to accept this "burden" (?), in order that their less gifted brethren may have also the advantages of reading in the original, scientific matter to be hereafter recorded.

We can not change the writings of the past, but the book of the future is ours to make or mar, and how better can we fill its pages than by recording the new triumphs of science in *one* language, an international language, which even her humblest worshipper may readily acquire? J. D. HAILMAN

PITTSBURGH,
December 13, 1909

RELATIVITY AND SOME OF ITS CONSEQUENCES

THE discussion of relativity in the recent meeting of the American Physical Society in Boston was a serious disappointment to me. It interfered with some of my future plans, and it left me in the dark concerning how those plans might be amended.

I had intended, when I became a disembodied spirit, to start outwards from my space

locus at that instant, and to travel with twice the velocity of light along my individual time emanations, until I had reached the beginning of my time career. I was, and am, curious to see how that history would appear when reviewed backwards in this manner. I had then planned to pause until my history should overtake me again. This would give me a chance to see myself as others had seen me. I had previously realized that this would be a cruise which would require a great deal of skill by reason of the constantly changing position of my individual time and space locus, due to terrestrial and solar motion. Still I had thought it possible to follow the tangled trail, by keeping my course at right angles to the daily and annual wave fronts, as they successively presented themselves.

It had seemed possible also to gain in this manner the experimental data necessary in the framing of a general system of vector analysis. This system would enable one to start with the space locus at which the earthly clay was shaken off, and to locate with reference to it any other point in his own time and space career. An increase in the length of the space vector in any direction would simultaneously carry one outward in space, forward in time and backward in history.

The Boston discussion did not supply one item of information which I had confidently expected. It is necessary that one should, on such a cruise, know the precise number of cubic miles in a cubic year. This information was not given us. In addition it was revealed that it is not possible for any velocity to be greater than that of light, or 3×10^{10} cm. per second.

Is this conclusion final? We can see that the waves which contain our spoken words lag greatly on those which embody our visible acts. May there not be some more refined medium, a spiritual medium, perhaps, in which v can exceed 3×10^{10} cm. per second?

Evidently we must no longer sneeze at discussions concerning the relation between the whereness of the when and the whenness of the where. The equations placed on that

Boston blackboard show that it may become possible to determine the relation between the present space locus of the instant when John Hancock finished his signature to a certain immortal document, and the present time locus of the point in space which his center of gravity then occupied.

FRANCIS E. NIPHER

"GEOMETRICAL" CANALS ON MARS?

A SUGGESTION

At the present writing, Mars is traveling rapidly away from the earth, but, unfortunately, its mystery remains. Much was expected from the observations to be made at the recent opposition, the most favorable one in some respects since 1892; and the planet has in fact been studied eagerly and carefully with telescopes of many sizes and kinds, and all the resources made available by the advance in our knowledge of photographic and spectroscopic processes have been drawn upon to aid in solving the problems Mars presents. The details of these observations, for the most part, have not yet been published, but enough has been written to show that the average astronomer, as well as the intelligent layman, is left in as great doubt as to the actual configuration of the surface of Mars and the meteorological conditions prevailing there as he was a year ago.

Even the fundamental question as to the size of telescope best adapted to the study of planetary detail remains an open one. On the one hand, an expert areographer, owner of a 24-inch refractor, has repeatedly claimed for his telescope "greater space-penetrating powers" (due to the combined excellences of his lens and his atmosphere) than those possessed by any other in the world, and says that it is by virtue of these powers that he can see Martian details invisible elsewhere. On the other hand, an astronomer in charge of a much larger refractor has recently said that his telescope was *too powerful*¹ to show

the canals on Mars. Again we are told that to get the best results in such studies we must use comparatively small telescopes or "cap down" the object glasses of the larger instruments—even a 24-inch aperture is improved by this process, it is said.

It is hardly necessary to call attention to the very diverse views held by areographers not only as to the interpretation to be put upon many of the markings observed on Mars—in particular, the geometrical network of the "canals"—but even as to their objective reality. Some optimists had hoped that photography would effectually dispose of all doubts on the latter point, and Mr. Lowell, indeed, has stated that his photographs have forever settled the matter. But one needs only to compare the drawing made by M. E. M. Antoniadi, himself an expert student of Martian topography, from forty of Mr. Lowell's photographs² with the direct prints from other photographs published by Mr. Lowell himself³ to realize that the "doctors disagree" as earnestly as ever. It would seem that the time has come for the experts to reach some definite agreement on these questions, and it is because I have a suggestion to offer that appears to be practicable and that would, if followed, undoubtedly clear the atmosphere, that I, who am merely an interested student, not an expert, have ventured to write this note.

Mr. Percival Lowell has long been known as the chief advocate of the view that the Martian "canals" and other delicate surface markings on the planet which he has so fully observed and described are objective realities, and that they offer unmistakable evidence of intelligent life on the planet. He has not only published his observations and conclusions in detail in technical publications, but he has also written several popular books on Mars—"science that reads like romance"—to support these views. He has also claimed over and over again that his telescope and his geographical location give him facilities for

¹ It is rather amusing, by the way, to note that some of our European friends seem to have missed entirely the point of this remark and have, indeed, taken it so seriously as to be offended!

² *Monthly Notices Royal Astronomical Society*, Vol. LXIX, p. 110, 1908.

³ *Proceedings of the Royal Society of London*, Series A, Vol. 177, p. 132, 1906.